Listing of the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-8. (canceled)

9. (currently amended) A multi-block copolymer comprising in polymerized form ethylene and one or more copolymerizable comonomers, said copolymer containing therein two or more ~~segments or~~ segmented blocks differing in comonomer content, crystallinity, density, melting point or glass transition temperature; the multi-block copolymer having a polydisperse block number distribution and a polydisperse distribution of block sizes.

10. (currently amended) The multi-block copolymer of claim 9 having at least one melting point, T_m, in degrees Celsius and density, d*, in grams/cubic centimeter, wherein the numerical values of the variables correspond to the relationship:

$T_m > -2002.9+4538.5(d^*)-2422.2(d^*)^2$, and wherein the copolymer ~~interpolymer~~ has a M_w/M_n from 1.7 to 3.5.

11. (previously presented) The multi-block copolymer of claim 9 having a Mw/Mn from 1.7 to 3.5, a delta quantity (tallest DSC peak minus tallest CRYSTAF peak) greater than the quantity, y*, defined by the equation:

$$y^* > -0.1299(\Delta H)+62.81,$$

and a heat of fusion up to 130 J/g,

wherein the CRYSTAF peak is determined using at least 5 percent of the cumulative polymer, and if less than 5 percent of the polymer has an identifiable CRYSTAF peak, then the CRYSTAF temperature is 30°C, and ΔH is the numerical value of the heat of fusion in J/g.

12. (previously presented) The multi-block copolymer of claim 9 having a

tensile strength above 10 MPa and an elongation at break of at least 600 percent at a crosshead separation rate of 11 cm/minute.

13. (withdrawn) The multi-block copolymer of claim 9 having a delta quantity (tallest DSC peak (measured from the baseline) minus tallest CRYSTAF peak) greater than 48°C and a heat of fusion greater than or equal to 130 J/g, wherein the CRYSTAF peak is determined using at least 5 percent of the cumulative polymer, and if less than 5 percent of the polymer has an identifiable CRYSTAF peak, then the CRYSTAF temperature is 30°C.

14. (previously presented) The multi-block copolymer of claim 9 having a storage modulus ratio, G'(25°C)/G'(100°C) of from 1 to 50 and a 70°C compression set of less than 80 percent.

15. (withdrawn) The multi-block copolymer of claim 9 having a heat of fusion of less than 85 J/g and a pellet blocking strength of equal to or less than 100 lbs/ft^2 (4800 Pa).

16. (previously presented) The multi-block copolymer of claim 9 comprising in polymerized form at least 50 mole percent ethylene, having a 70°C compression set of less than 80 percent.

17. (previously presented) The multi-block copolymer of claim 9, containing a single crystalline melting point (Tm) as measured by DSC.

18. (previously presented) The multi-block copolymer of claim 9, having a thermomechanical analysis penetration depth of 1 mm at a temperature of at least 90°C, and a flexural modulus of from 3 kpsi (20 MPa) to 13 kpsi (90 MPa).

19. (canceled)

20. (previously presented) The multi-block copolymer of claim 9, having an abrasion resistance volume loss according to ISO 4649 of less than 90 mm^3.

21. (previously presented) The multi-block copolymer of claim 18 having an abrasion resistance volume loss according to ISO 4649 of less than 90 mm^3.

22. (previously presented) The multi-block copolymer of claim 9, having an abrasion resistance volume loss according to ISO 4649 of less than 90 mm^3 and having a storage modulus, G', such that log (G') is greater than or equal to 0.4 MPa, at a temperature of 100°C.

23. (previously presented) The multi-block copolymer of claim 18 having an abrasion resistance volume loss according to ISO 4649 of less than 90 mm^3 and having a storage modulus, G', such that log (G') is greater than or equal to 0.4 MPa at a temperature of 100°C.

24. (withdrawn) The multi-block copolymer according to claim 20 having a storage modulus, G', such that log (G') is greater than or equal to 1.0 MPa, at a temperature of 100°C.

25. (withdrawn) The multi-block copolymer according to claim 21 having a storage modulus, G', such that log (G') is greater than or equal to 1.0 MPa, at a temperature of 100°C.

26. (withdrawn) A crosslinked derivative of a multi-block copolymer according to any one of claims 9-25, or preparable by the method of claim 8.

27. (currently amended) ~~A~~ The multi-block copolymer according to claim 9 ~~any one of claims 9-12, 14, 16-23 and 27, or preparable by the method of claim 8, or a composition comprising the same~~ in the form of a film, at least one layer of a multilayer film, at least one layer of a laminated article, a foamed article, a fiber, a nonwoven fabric, an injection molded article, a blow molded article, a roto-molded article, or an adhesive.

28. (new) The multi-block copolymer of claim 9 comprising a M_w/M_n fitting a Schultz-Flory distribution.

29. (new) The multi-block copolymer of claim 9 comprising a block with at least 90 mol percent units of polymerized ethylene.

30. (new) The multi-block copolymer of claim 9 wherein the average number of blocks per average chain is greater than 3.0.

31. (new) The multi-block copolymer of claim 9 wherein the chain ends of the individual multi-block copolymer chains are crystalline.

32. (new) The multi-block copolymer of claim 9 having a microcrystalline order selected from the group consisting of spherulites and lamellae.

33. (new) The multi-block copolymer of claim 32 having a M_w/M_n of 1.3 or greater.

34. (new) A multi-block copolymer comprising in polymerized form ethylene and one or more copolymerizable α-olefin comonomers, said copolymer containing therein two or more segmented blocks differing in comonomer content, crystallinity, density, melting point or glass transition temperature; and

zinc.

35. (new) The multi-block polymer of clam 34 having a microcrystalline order selected from the group consisting of spherulites and lamellae.

36. (new) A multi-block copolymer and catalyst system, the multi-block copolymer comprising in polymerized form ethylene and one or more copolymerizable

comonomers, said copolymer containing therein two or more segmented blocks differing in length, comonomer content crystallinity, density, melting point or glass transition temperature;

the block length conforming to a most probable distribution according to the equation

$X_i[n] = (1-p_i)p_i^{(n-1)}$

wherein

i is an integer representing the number of catalysts and i is at least 2,

n is an integer from 1 to infinity representing the number of monomer units in the block, and

p_i is the probability of propagation with respect to block sequences from catalyst i.